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Evaluation Method 評價方法

Circuit used for determination 特性電路圖

## Circuit 1 特性回路1

Line&Load Regulation And Temperature Chafaile Character (輸入&負荷及溫度變動特性)

Over-Voltage Protection (過電壓保護特性)

Over-Current Protection (過電流保護特性)

Dynamic ripple Character(動態負載特性)

Efficiency Character(效率特性)

Input&Load Change Character(輸入&負荷變動特性)

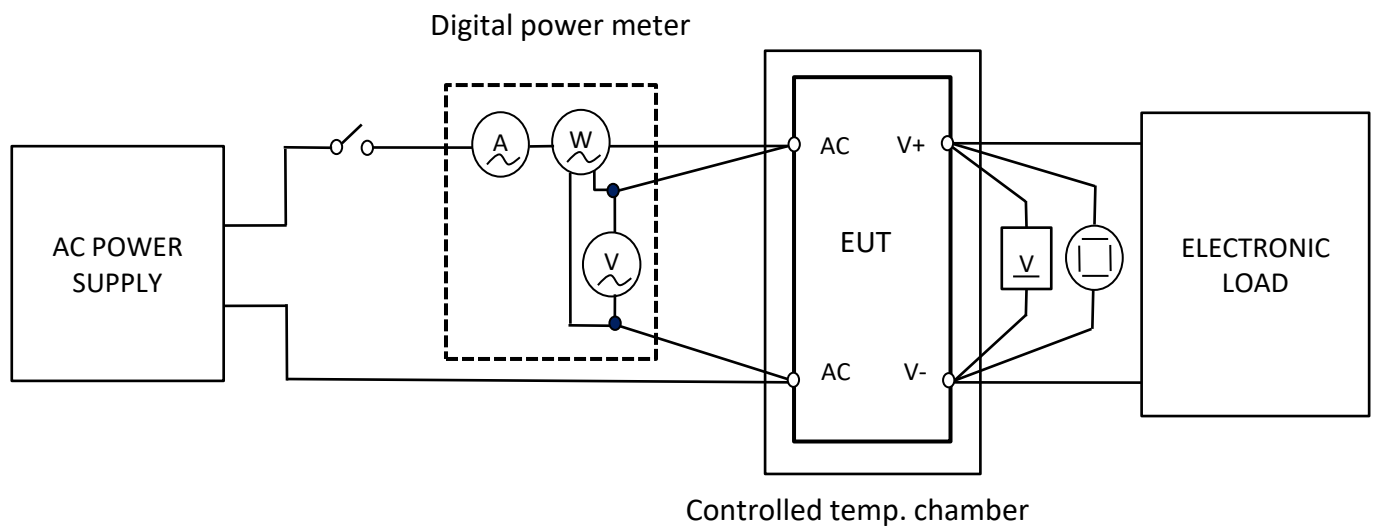
Turn On Delay(開機爬升延遲時間)

Hold Up Time Character (保持時間)

Low Vac Shut Off (輸入欠壓關斷特性)

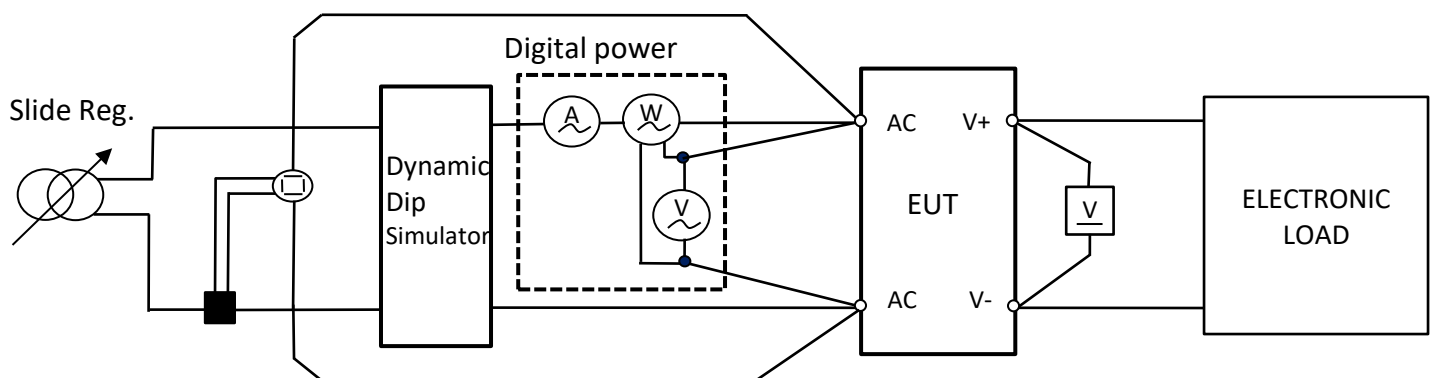
Over Shoot(過沖特性)

Under Shoot(下沖特性)



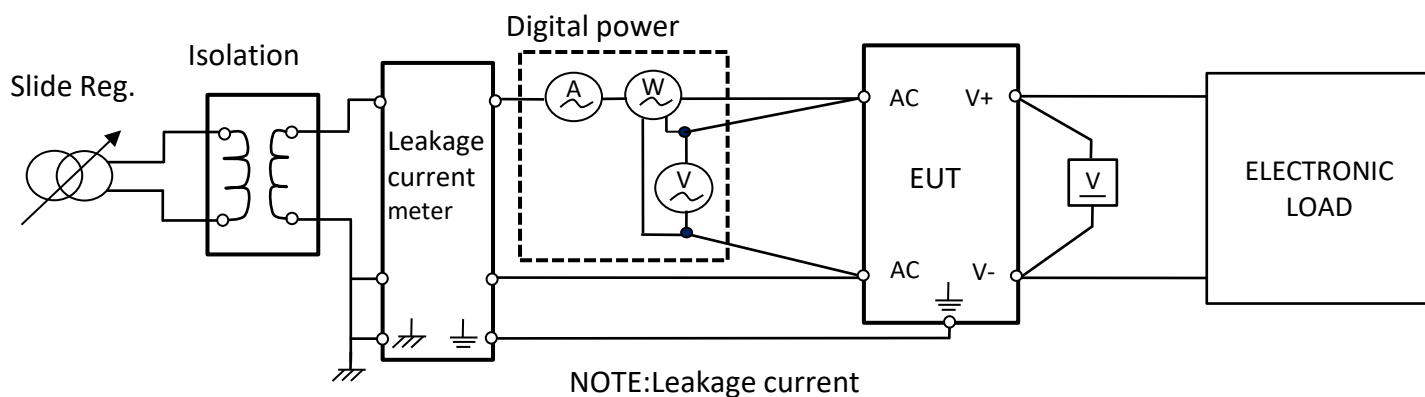
## Circuit 2 特性回路2

Inrush Current (浪涌電流)



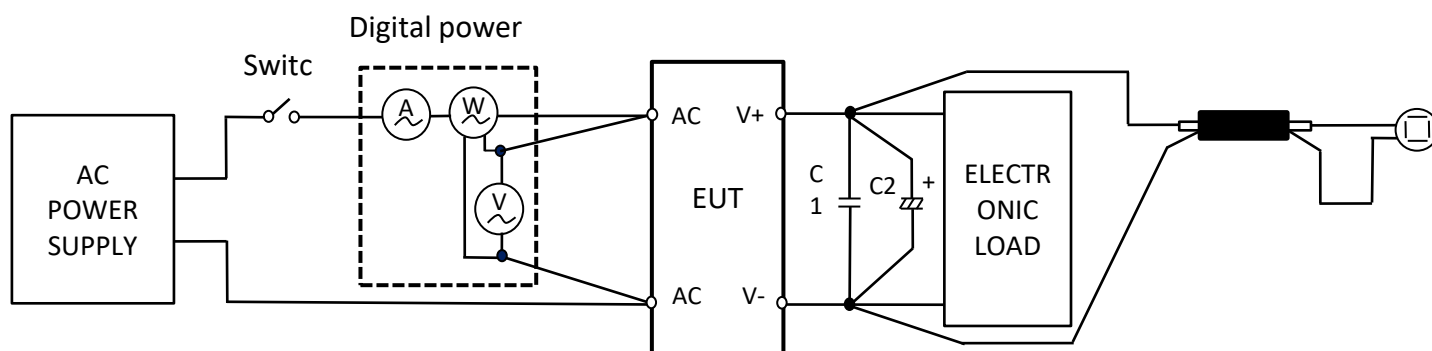
## Circuit 3 特性回路3

Leak Current (漏電流特性)



## Circuit 4 特性回路4

Ripple And Noise Character(紋波特性)



C1 : 0.1 $\mu$ F CERAMICS CAPACITOR

C2 : 10 $\mu$  100V ALUMINUM CAPACITOR

THE BANDWIDTH OF OSCILLOSCOPE IS SET WITH 20MHz

## 1.ELECTRICAL FUNCTION Character(電氣特性)

## 1-1.Line&amp;Load Regulation And Temperature Chafaile Character (輸入&amp;負荷及溫度變動特性)

※ Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	85Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	0%,25%,50%,75%,100% Of Full Load
4	Regulation(調整率)	Load Regulation: $\leq 10\%$ ; Line Regulation $\leq 2\%$
5	Ambient Temp.(°C)(環境溫度)	25°C
6	Sample Size(取樣數)	1PCS

Output voltage	12.0V
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※ Character Data(特性數據) :

O/P \ I/P	85Vac/63Hz	100Vac/60Hz	240Vac/50Hz	265Vac/47Hz	Line Regulation $\leq 2\%$
0%	12.061V	12.061V	12.062V	12.063V	0.02%
25%	12.034V	12.035V	12.036V	12.037V	0.03%
50%	12.008V	12.008V	12.01V	12.011V	0.03%
75%	11.98V	11.981V	11.983V	11.984V	0.03%
100%	11.953V	11.954V	11.957V	11.957V	0.03%
Load Regulation: $\leq 10\%$	0.90%	0.89%	0.87%	0.88%	

## 1-2.1 Ripple And Noise Character (紋波與雜訊)

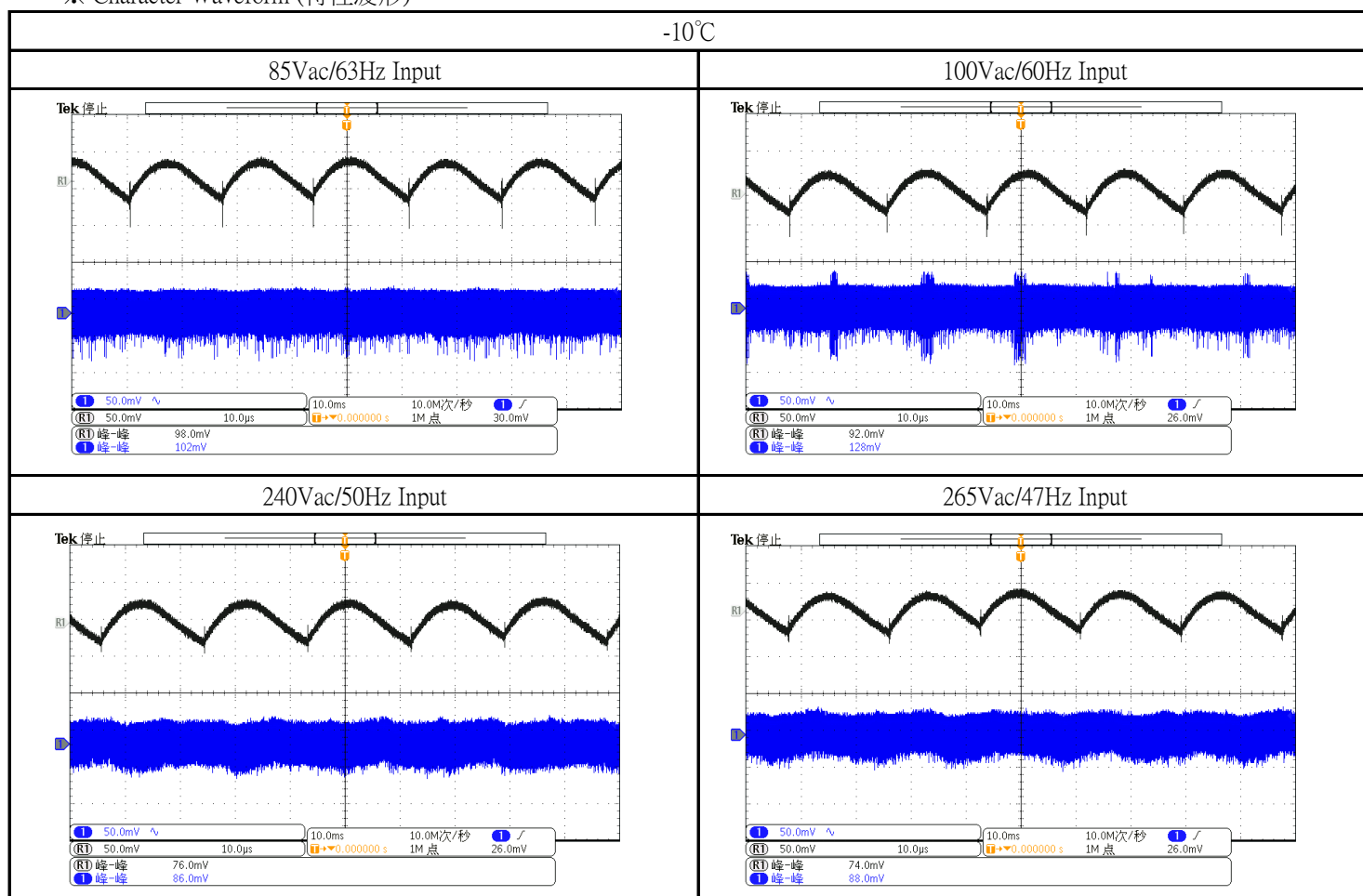
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	-10°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	85Vac/63Hz		100Vac/60Hz		240Vac/50Hz		265Vac/47Hz	
ITEM	Ripple	Noise	Ripple	Noise	Ripple	Noise	Ripple	Noise
-10°C	98.0mV	102.0mV	92.0mV	128.0mV	76.0mV	86.0mV	74.0mV	88.0mV

※ Character Waveform (特性波形):



## 1-2.3 Ripple And Noise Character (紋波與雜訊)

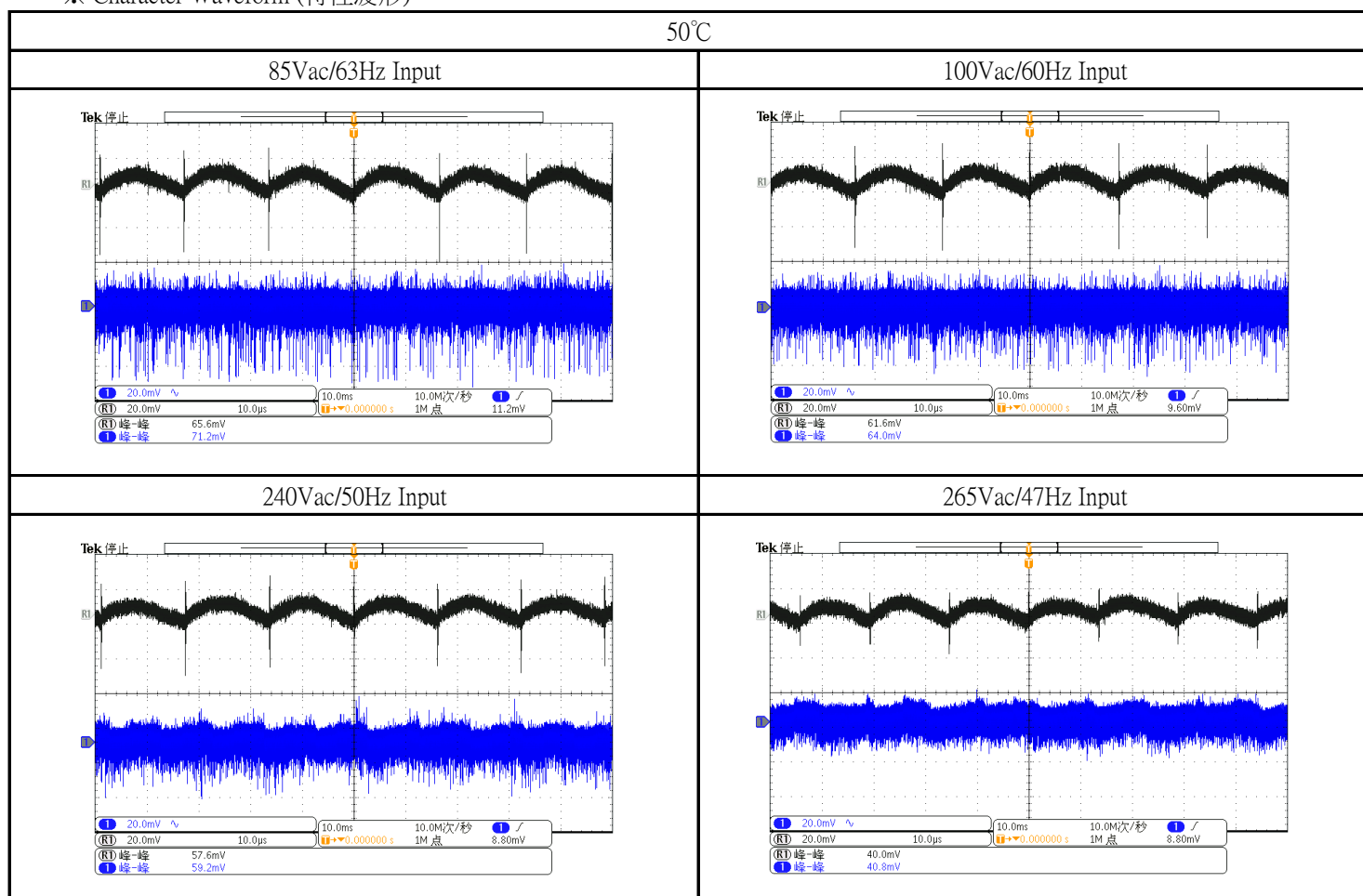
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	50°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	85Vac/63Hz		100Vac/60Hz		240Vac/50Hz		265Vac/47Hz	
ITEM	Ripple	Noise	Ripple	Noise	Ripple	Noise	Ripple	Noise
50°C	65.6mV	71.2mV	61.6mV	64.0mV	57.6mV	59.2mV	40.0mV	40.8mV

※ Character Waveform (特性波形):



## 1-3.Over-Voltage Protection(過電壓保護特性)

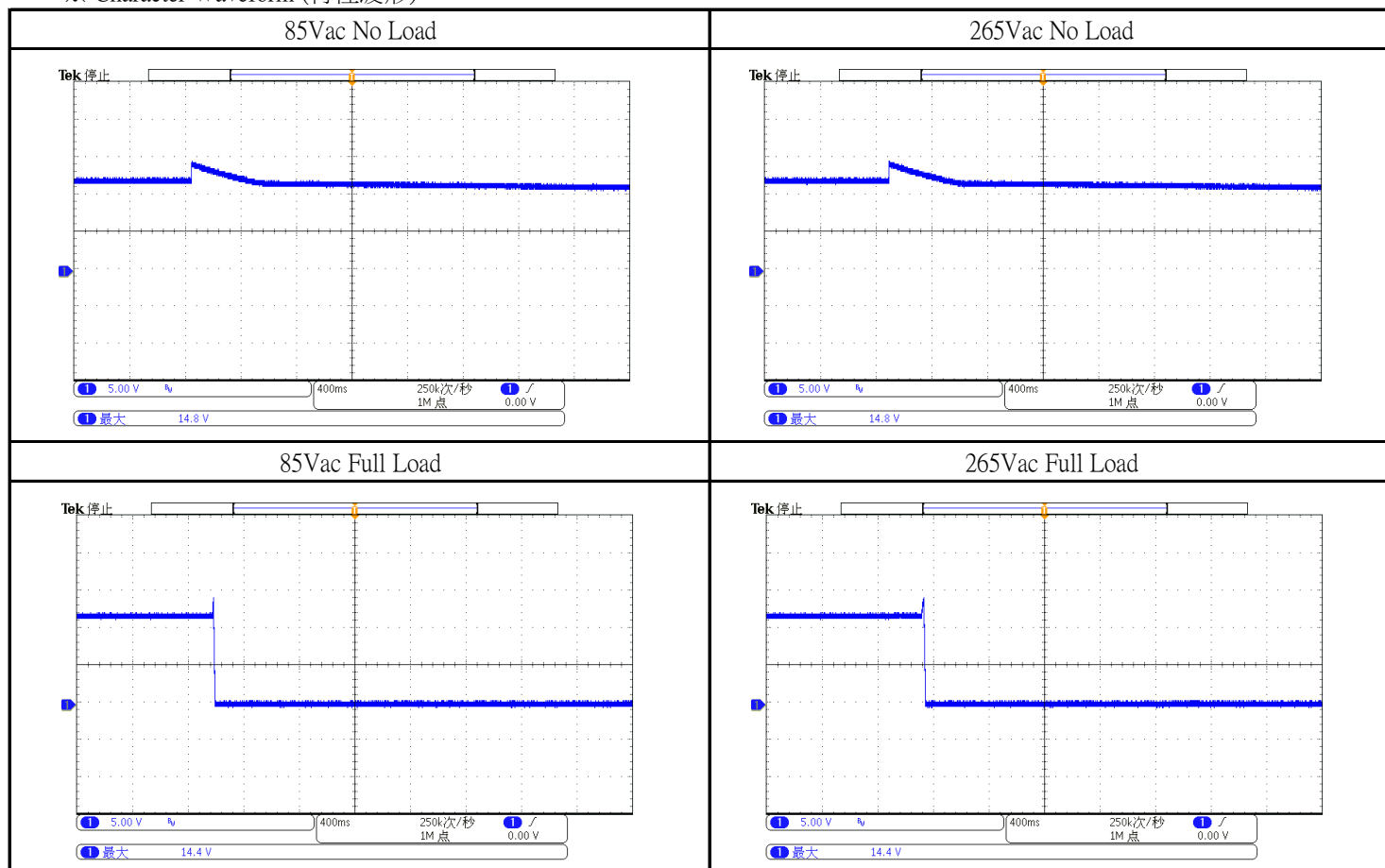
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	No/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

O/P	No Load		Full Load	
I/P	85Vac/63Hz	265Vac/47Hz	85Vac/63Hz	265Vac/47Hz
Character Result	14.8V	14.8V	14.4V	14.4V

※ Character Waveform (特性波形):



## 1-4.Over-Current Protection(過電流保護特性)

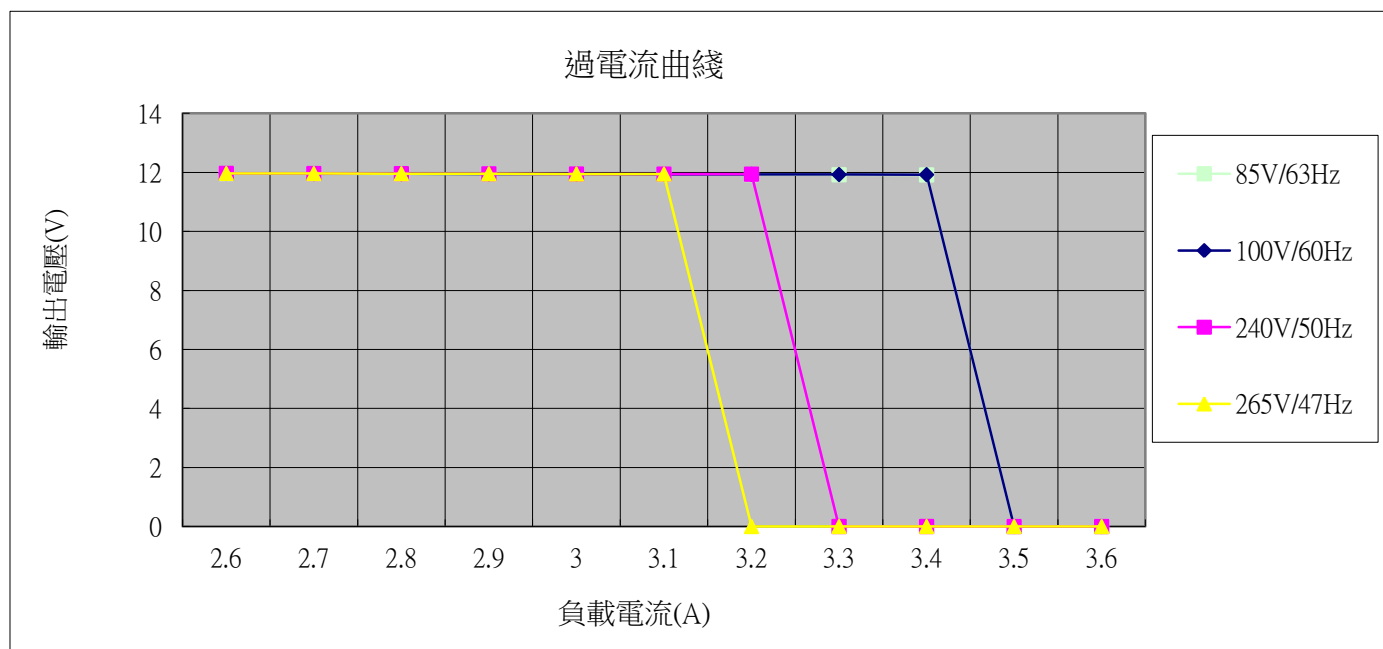
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/100Vac/240Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	85V/63Hz	100V/60Hz	240V/50Hz	265V/47Hz
O.C.P點	3.5A	3.5A	3.3A	3.2A

I/P	85V/63Hz										
Voltage(V)	11.955	11.95	11.945	11.94	11.935	11.93	11.925	11.92	11.915	0	0
Current(A)	2.6	2.7	2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6
I/P	100V/60Hz										
Voltage(V)	11.962	11.958	11.953	11.948	11.943	11.938	11.933	11.928	11.924	0	0
Current(A)	2.6	2.7	2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6
I/P	240V/50Hz										
Voltage(V)	11.966	11.961	11.957	11.952	11.947	11.943	11.94	0	0	0	0
Current(A)	2.6	2.7	2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6
I/P	265V/47Hz										
Voltage(V)	11.968	11.963	11.958	11.954	11.949	11.946	0	0	0	0	0
Current(A)	2.6	2.7	2.8	2.9	3	3.1	3.2	3.3	3.4	3.5	3.6





## 1-5. Dynamic ripple Character(動態負載特性)

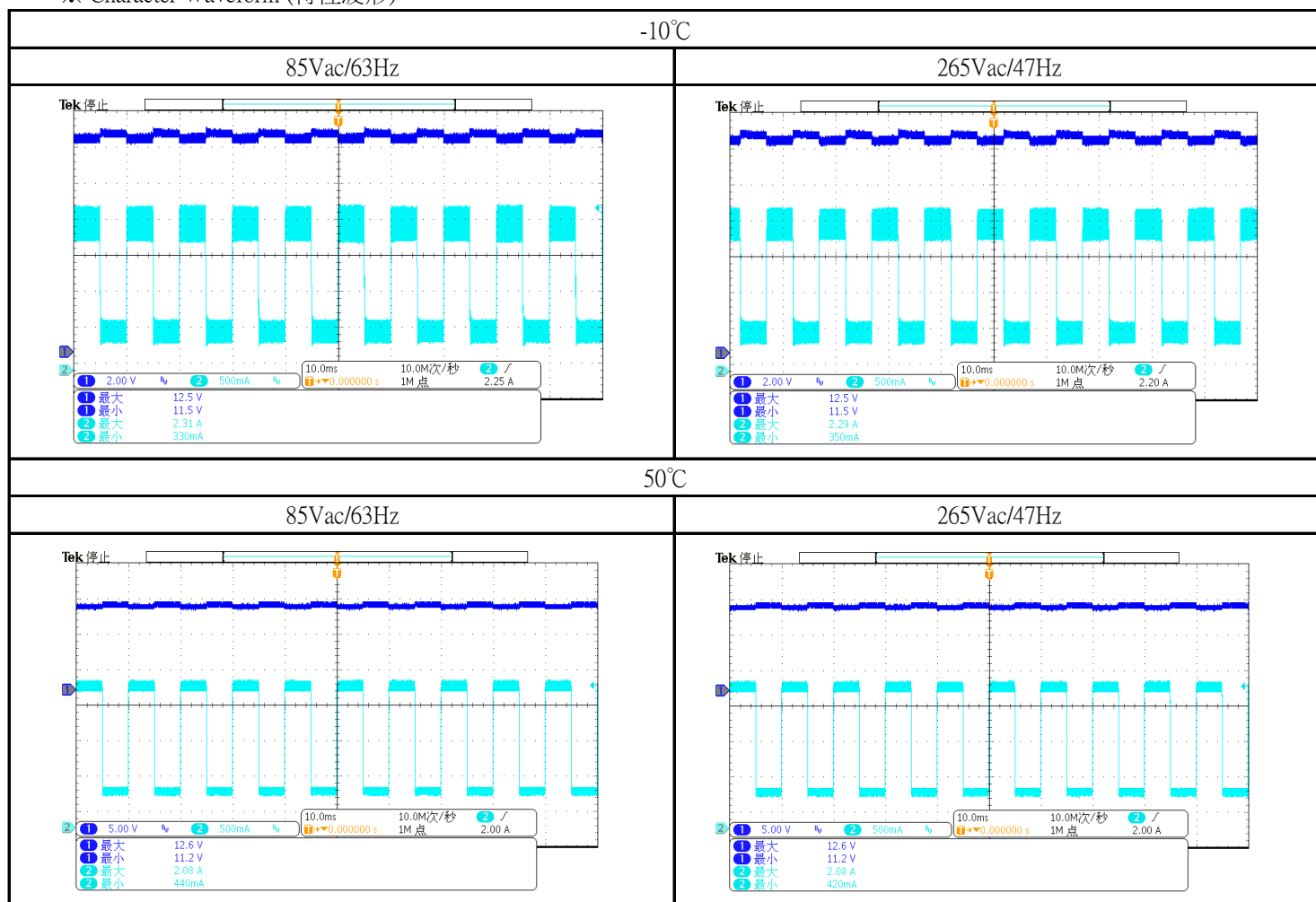
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	20%-80% Full Load, TH=5ms, TL=5ms, Slew rate=0.1A/us
4	Ambient Temp.(°C)(環境溫度)	-10°C /50°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

I/P	85Vac/63Hz		265Vac/47Hz	
O/P	Max	Min	Max	Min
-10°C	12.5V	11.5V	12.5V	11.5V
50°C	12.6V	11.2V	12.6V	11.2V

※ Character Waveform (特性波形):



1-6.Efficiency Character(效率特性)

※ Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	115Vac/230Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz / 60Hz
3	Output Load(輸出負載)	0%,10%,25%,50%,75%,100% of Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
6	Output Load(輸出負載)	2.0A

※ Character Data(特性數據) :

使用線材	N/A
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Efficiency								Stand by consumption	
Load		10% 25% 50% 75% 100%						0%	
I/P		115Vac/60Hz			230Vac/50Hz			Input 115V/60Hz	230V/50HZ
O/P Load		Pin (W)	Pout (W)	Efficiency (%)	Pin (W)	Pout (W)	Efficiency (%)	0.035W	0.09W
10%	0.25A	3.37	3.02	89.61%	3.53	3.02	85.55%		
25%	0.625	8.3	7.55	90.96%	8.37	7.55	90.20%		
50%	1.25A	16.71	15.07	90.19%	16.68	15.07	90.35%		
75%	1.88A	25.22	22.55	89.41%	25.01	22.56	90.20%		
100%	2.5A	34.12	29.98	87.87%	33.41	30.00	89.79%		
Average				89.61%			90.14%		

1-7.Input&Load Change Character(輸入&負荷變動特性)

※ Character Condition(特性條件)：

1	I/P Voltage(Vac)(輸入電壓)	85Vac~265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz ~63Hz
3	Output Load(輸出負載)	No Load and Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
6		

※ Character Equipment(特性設備)：

ITEM	Equipment Item(設備)	Model No. / Manufacturer(製造商和型號)
1	AC Source(變頻器)	ALL POWER/APG-1005N
2	Power Meter(功率表)	YOKOGAWA/WT310
3	DC Load(DC負載)	ITECH/IT8512+

※ Character Data(特性數據)：

Input change with no load			
No Load		Input Condition	
		85V/63Hz	265Vac/47Hz
	Input Current ( A )	0.005	0.011
	Input Power ( W )	0.027	0.125
Input change with full load			
Full Load		Input Condition	
		85V/63Hz	265Vac/47Hz
	Input Current ( A )	0.658	0.277
	Input Power ( W )	34.63	33.39

## 1-8.Inrush Current (浪涌電流)

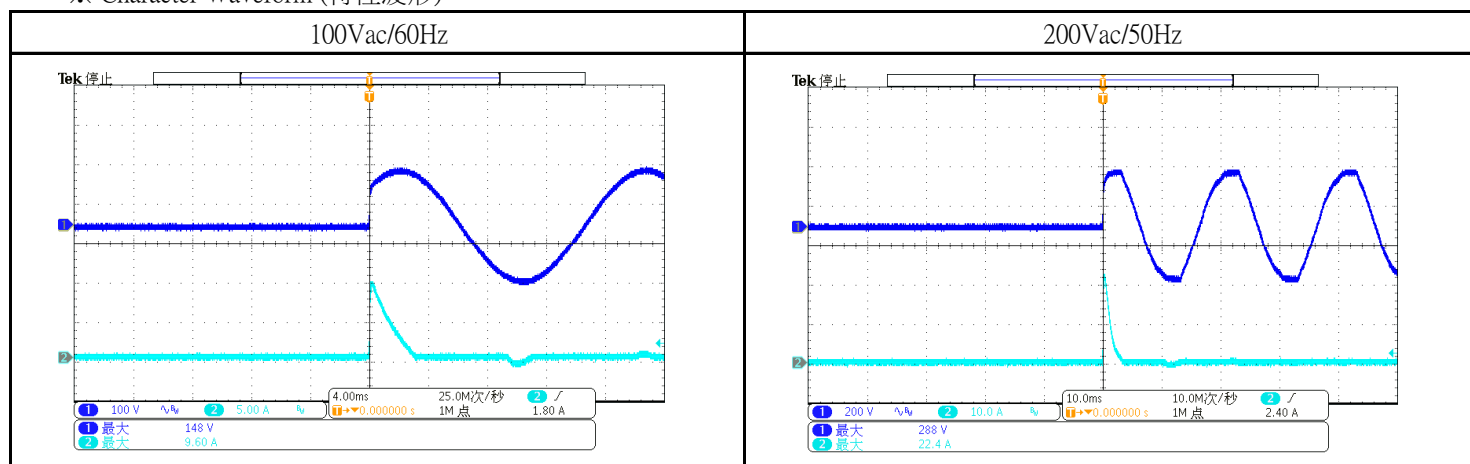
※ Character Condition(特性條件)：

1	I/P Voltage(Vac)(輸入電壓)	100Vac/200Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz /60Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據)：

Inrush Current		
O/P I(P) I(A)	Full Load	Full Load
	100Vac/60Hz	200Vac/50Hz
Character Result	9.6A	22.4A

※ Character Waveform (特性波形)：



## 1-9.Turn On Delay(開機爬升延遲時間)

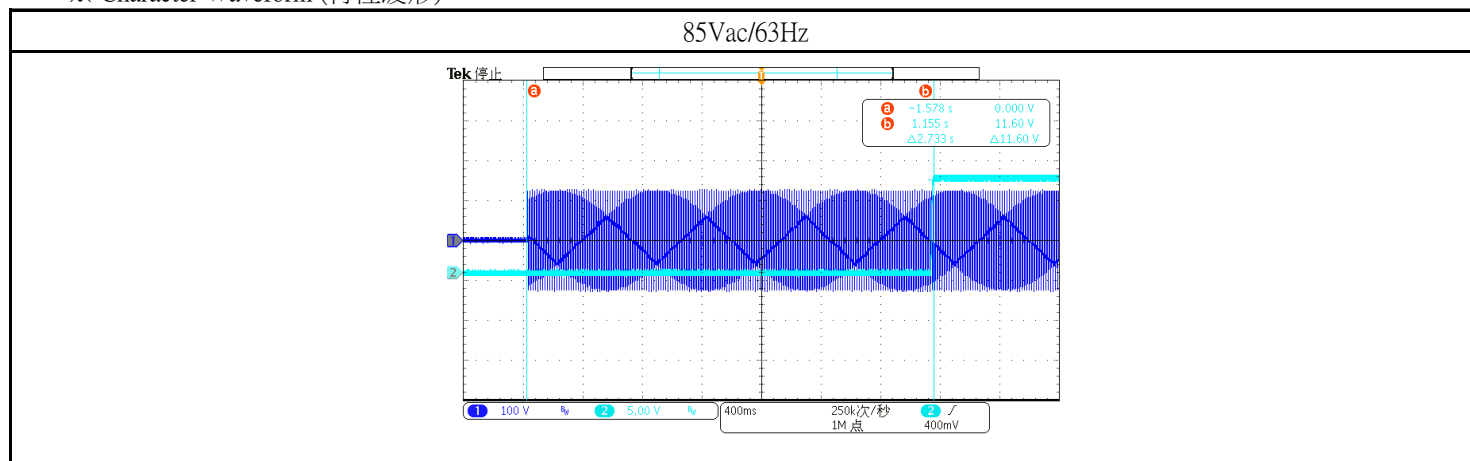
※ Character Condition(特性條件)：

1	I/P Voltage(Vac)(輸入電壓)	85Vac
2	I/P Frequency(Hz)(輸入頻率)	63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據)：

Turn on delay time	
I/P	85Vac/63Hz
Character Result	2.733S

※ Character Waveform (特性波形)：



## 2-1. Hold Up Time Character (保持時間)

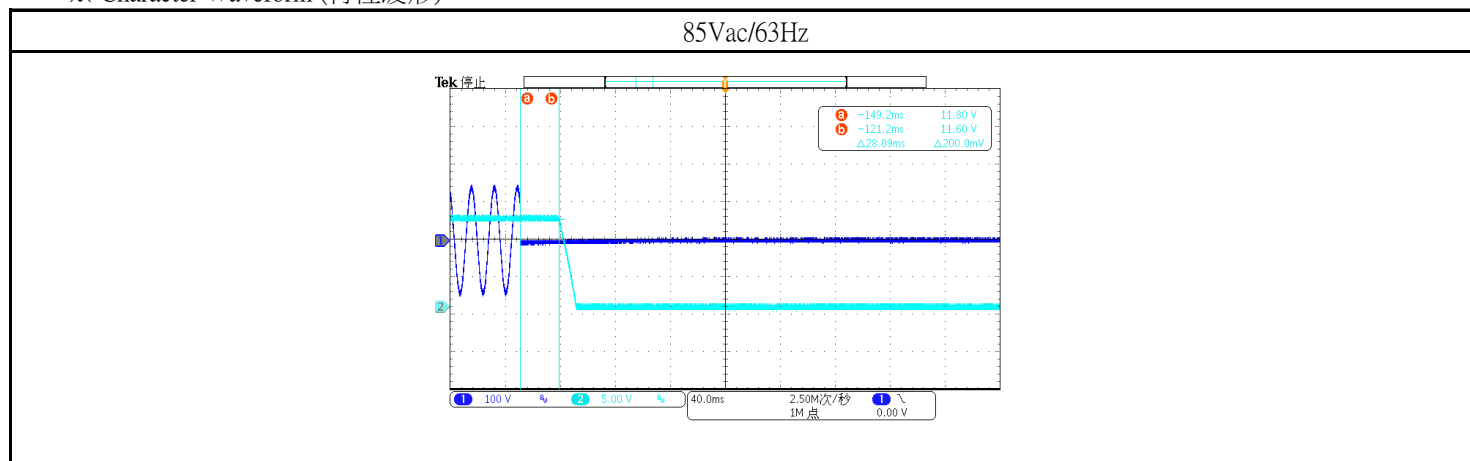
※ Character Condition(特性條件)：

1	I/P Voltage(Vac)(輸入電壓)	85Vac
2	I/P Frequency(Hz)(輸入頻率)	63Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據)：

Hold up time	
I/P	85Vac/63Hz
Character Result	28.09mS

※ Character Waveform (特性波形)：



## 2-2. Low Vac Shut Off (輸入欠壓關斷特性)

※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	0~85Vac
2	I/P Frequency(Hz)(輸入頻率)	60Hz
3	Output Load(輸出負載)	Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

LOW Vac SHUT OFF	
0~85Vac Input	
O/P	Full Load
Brown in	73.0V
85~0Vac Input	
O/P	Full Load
Brown out	67.0V

## 2-3. Over Shoot(過沖特性)

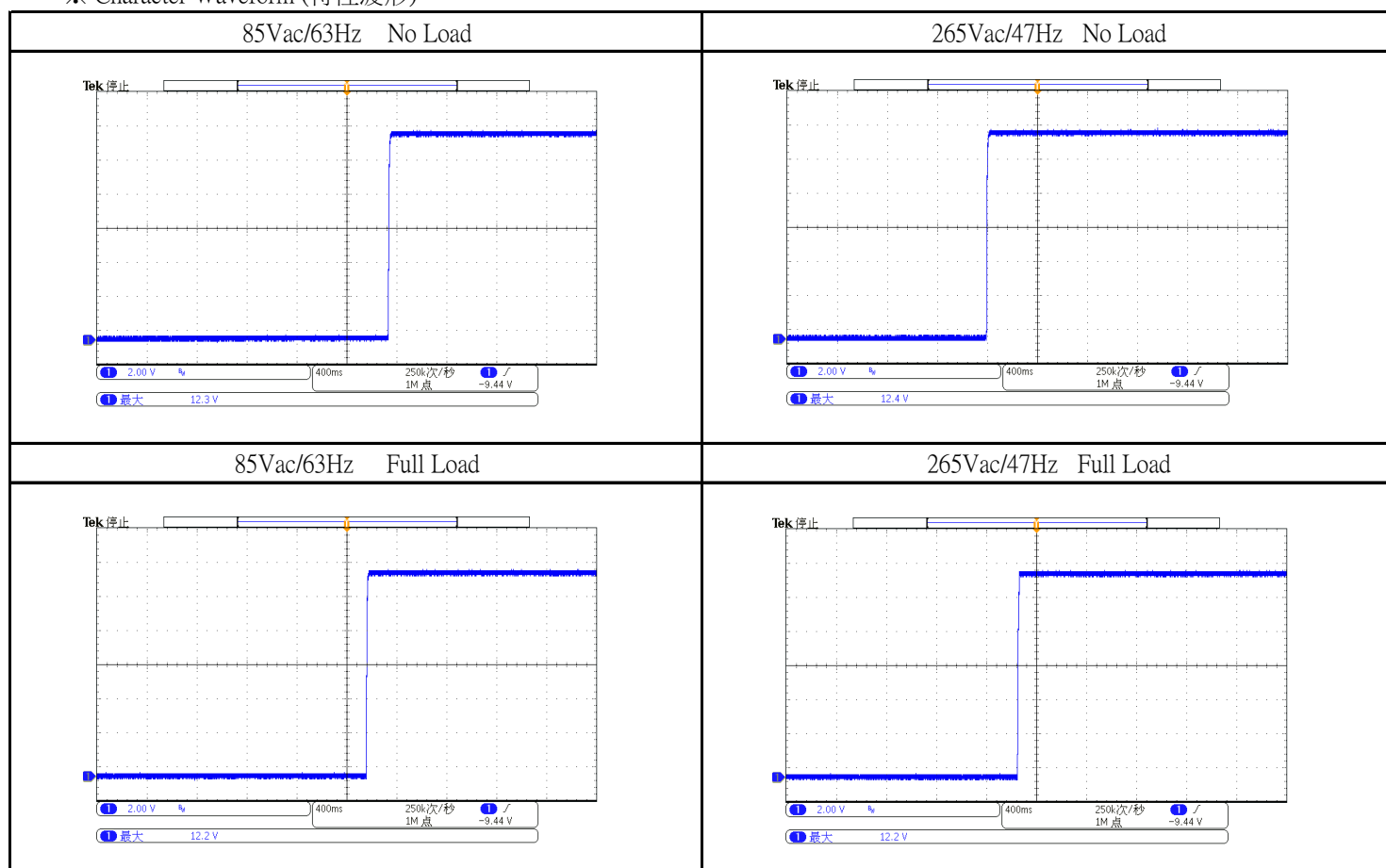
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	No Load/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

Over Shoot				
O/P	No Load		Full Load	
I/P	85Vac/63Hz	265Vac/47Hz	85Vac/63Hz	265Vac/47Hz
Character Result	12.3V	12.4V	12.2V	12.2V

※ Character Waveform (特性波形):





## 2-4.Under Shoot(下沖特性)

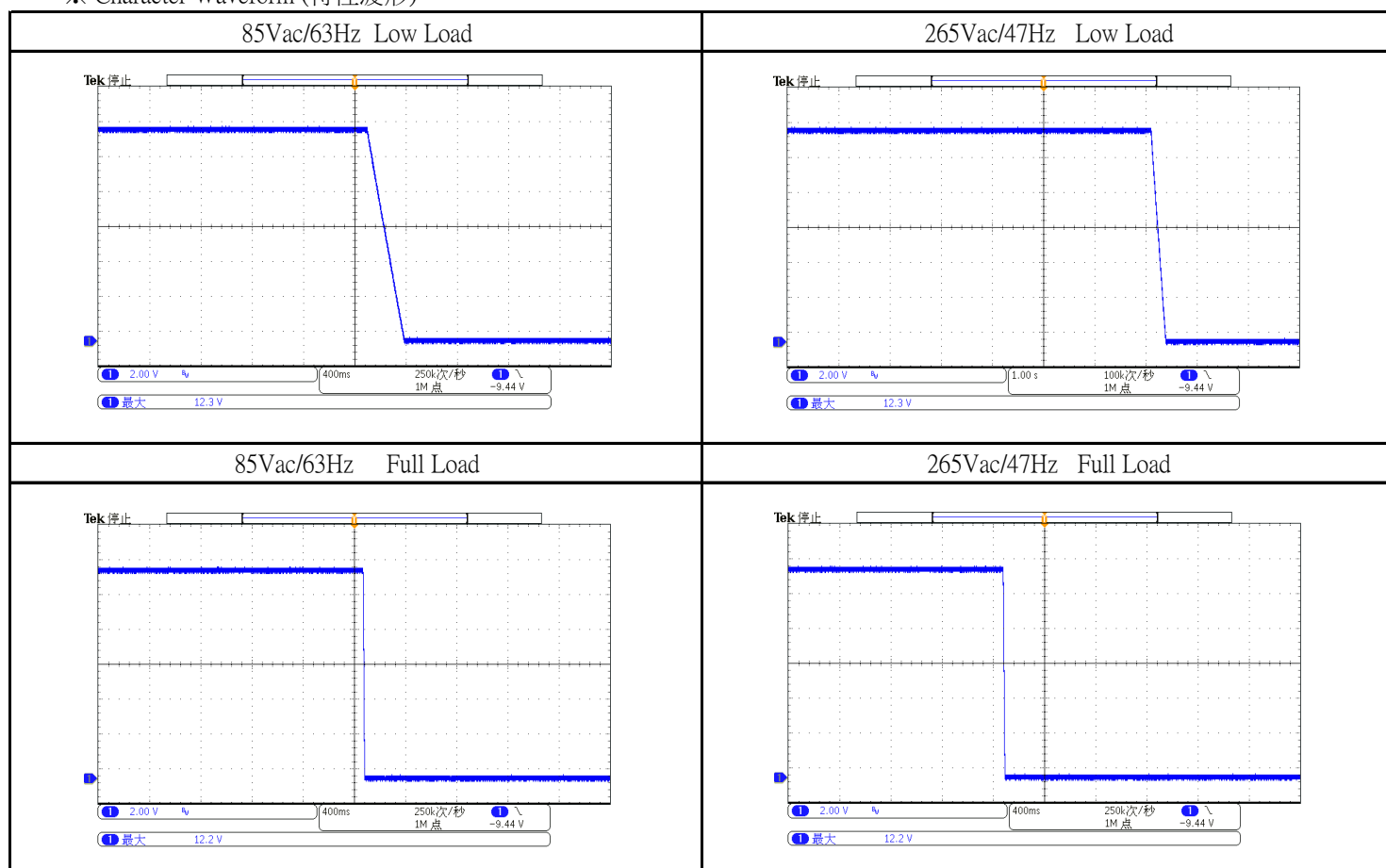
※ Character Condition(特性條件):

1	I/P Voltage(Vac)(輸入電壓)	85Vac/265Vac
2	I/P Frequency(Hz)(輸入頻率)	47Hz /63Hz
3	Output Load(輸出負載)	Low/Full Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS

※ Character Data(特性數據):

Under Shoot				
O/P	0.1A		Full Load	
I/P	85Vac/63Hz	265Vac/47Hz	85Vac/63Hz	265Vac/47Hz
Character Result	12.3V	12.3V	12.2V	12.2V

※ Character Waveform (特性波形):



## 2-5.Leak Current(漏電流特性)

※Character Condition(特性條件) :

1	I/P Voltage(Vac)(輸入電壓)	265Vac
2	I/P Frequency(Hz)(輸入頻率)	50Hz
3	Output Load(輸出負載)	No Load
4	Ambient Temp.(°C)(環境溫度)	25°C
5	Sample Size(取樣數)	1PCS
6		

※Character Equipment(特性設備) :

ITEM	Equipment Item(設備)	Model No. / Manufacturer(製造商和型號)
1	Leak current Characterer(泄漏電流特性儀)	VG2301
2		
3		
4		

### LEAK CURRENT CHARACTER

Spec.(mA MAX)	0.5
O/P	No Load
I/P	265Vac

※Character Data :

### SINGLE-PHASE EQUIPMENT

The Character was made in all combinations to the normal and reverse polarity of the supply circuit(Polarity Switch P1)

Terminal A (Switch"s") of Measuring Instrument Connected to:	Switch"e" Position	Touch Current (mA r.m.s.)				
		Polarity P1/Primary Switch Condition				
		Normal/On	Normal/Off	Reverse/On	Reverse/Off	Judgement
Output	Closed	0.19		0.18	-	Pass

- ☐ The touch current [did not] exceed \_\_\_\_\_ mA r.m.s with terminal A connected to the earth terminal of the unit with Switch "e" opened.
- ☒ The touch current [did not] exceed 0.5 mA r.m.s with terminal A connected to the earth terminal of the unit with Switch "e" closed.